

Remarks

This Amendment is in response to the Office Action dated **June 18, 2009**.

Claims 1-3, 7, 10-11 and 64-74 are currently pending. Claim 1 has been amended.

Claims 64-74 are new. Claims 1 and 64 are independent.

Claim Rejections 35 USC §103

Claims 1-3, 7, 10-11 have been rejected under 35 U.S.C. 103(a) as obvious over Padwa (US Pat. 5,082,742) or Roeber et al. (US Pat. 6,386,240), whether alone or in view of Vonk et al. (US Pat. 4,876,130). The rejection is traversed.

Claim 1 recites a laminate article in which a tie-layer polymer material is obtained by melt modification of one the first or the second polymer materials. That is, modification of one of the same materials used for the first and second layers. This is not merely a polymer of the same monomer(s). Before it is modified in the manner specified in the claims, the tie layer polymer is the same material as is used for one of the two layers. The tie layer is formed by modification of that polymer material with a coupling agent. Also according to claim 1, the tie-layer bonds the first and second layers. Therefore no intervening layer is involved. The recitations of claim 1 apply to three adjacent layers.

Further in claim 1 the coupling agent is a member of the group consisting of compounds having plural epoxy groups thereon, compounds having plural oxazoline groups thereon, compounds having plural carbodiimide groups thereon and compounds having plural isocyanate groups thereon.

Padwa discloses composite sheet prepared by coextrusion or compression molding used for truck-bed and refrigerator liners is formed as a three layer (single tie-layer) or four layer (dual tie-layer) laminate.

The general descriptions in the abstract of Padwa does not teach any specific relationship between the materials of the respective layers, nor does it teach what functionalization is used. Nor does the Summary of the Invention. Therefore examination must be made to the detailed description to ascertain whether the features of claim 1 are taught or suggested.

In the case of a three-layer laminate the single tie layer is not formed from one of the first or second polymer layer materials with at least 5% by weight of a coupling agent. A tie layer of functionalized thermoplastic resin and functionalized polyolefin is used with the preferred example being (B) glycidyl methacrylate/styrene/acrylonitrile terpolymer and acrylic acid-functionalized polypropylene used as tie layer between layers of (A) ABS and (C) polypropylene or rubber-modified polypropylene (col. 3, lines 49-62). Neither the glycidyl methacrylate/styrene/acrylonitrile terpolymer nor the acrylic acid-functionalized polypropylene, matches the acrylonitrile-butadiene-styrene (ABS) material of layer (A) or the polypropylene or rubber-modified polypropylene of layer (C). Thus the specific three-layer laminates Padwa also do not teach or suggest a tie-layer as recited in claim 1.

To the extent a four layer laminate is considered, only three adjacent layers are relevant to the claimed subject matter. Regardless of whether one takes the layers (I), (II), (III) or the layers (II), (III), (IV), there is likewise no specific disclosure of laminate having all of the features recited in claim 1. Functionalization in layer (III) is with carboxylic acid so the combination of layers (II), (III), (IV) is not relevant to claim 1. As to the layers (I), (II), (III),

note that the teachings at col. 2, lines 44-48 in which an epoxy functionalized ABS is included as an option the functionalized thermoplastic resin is not a teaching to use the same ABS employed in the layer (I). In fact the examples always use different polymers for the layers (I) and (II). Also, in no case involving a epoxide, is there a modification of a preexisting polymer. Instead an epoxy functionalized polymer is formed as a novel component from monomer components. The skilled person would see this and apply it to the teaching of functionalized ABS polymer. The result would be to prepare a novel polymer from acrylonitrile, butadiene, styrene and glycidyl methacrylate to produce a functionalized ABS polymer as the layer II material, not to modify the same ABS polymer used in the first layer. There is no teaching or suggestion in Padwa to modify an existing thermoplastic resin in preparing the layer (II) material.

Roeber et al (US Pat. 6,386,240) pertains to a laminate plastic pipe. The laminate contains a polyolefin layer I, a thermoplastic polyester layer II, and an intervening tie layer III. The tie layer includes a polyolefin base which is modified with reactive groups. In a preferred embodiment the layer II also includes reactive groups, which may be isocyanate, epoxy or oxazoline groups. The reactive groups of the layer III are preferably acid anhydride groups. but can also be oxazoline or epoxy groups. The reactive groups can be introduced either by copolymerization together with, e.g., an olefin or by a grafting reaction. In the case of copolymerization the polymer will be novel by definition. In the case a grafting reaction, Roeber et al states a preformed polyolefin is reacted in known manner with an unsaturated, functional monomer and advantageously a free-radical donor at elevated temperature. It does not teach to use the same polymer in the layer III as in one of the layers I and II. Also in the case of the exemplary commercial polymers listed at col. 5, lines 20-25, the polymers are not the same as the

polymer used for the layer I regardless of how they are prepared. Note that Roeber et al states that the polymer base of the layer III is preferably miscible with the polymer I (col 5, line 10), but this is not equivalent to a teaching to use the same polymer material . Two polyolefin polymers can be fully miscible, and even be made from the same monomer(s) but have very different molecular weights, so the miscibility teaching does not arguably meet the claim by inherency. Note further that in the examples the polymer base materials of the three layers are all different. See the examples in which the material PO 1 and PO 2 are both HDPE, the polymer materials PE 1 and PE 2 are compositions based on polybutylene terephthalate and blocked isocyanate, and the tie-layer is either LDPE modified with maleic anhydride or ethylene-vinyl acetate copolymer modified with maleic anhydride. As is well known, HDPE and LDPE are not the same polymer materials even though they are made from the same monomer. Likewise, as is well known, ethylene-vinyl acetate is not the same polymer material as HDPE. Consequently Roeber et al also fails to teach a tie layer polymer that is the same polymer material as one of the adjacent layer materials modified with a coupling agent.

Vonk et al. pertains to a bituminous composition and use as a self-adhesive. Vonk et al, does not pertain to a formulation of a tie-layer for a laminate. Further, the discussion of coupling agents in Vonk et al. pertains to formation of a star-shaped polymers and it appears that the epoxy groups would be reacted in the formation of such polymers. Consequently the use of a polyepoxide in Vonk et al it is not analogous to the epoxy functionalization discussed in Padwa or to the layer III reactive groups used in Roeber et al. A skilled person seeking to functionalize a thermoplastic resin for use in a tie layer of a composite sheet for truck-bed and refrigerator liners as taught by Padwa or in a tie layer of a plastic pipe laminate as taught by Roeber et al would not

look at this document. Roeber et al does not lead one to use the same polymer material in its tie layer as in one of the adjacent layers. Applicant does not see how a skilled person who happened upon Vonk et al would find in it a teaching of an alternative to the use of a monoepoxide monomer for forming a functionalized thermoplastic resin of Padwa or for forming the tie layer for the plastic pipe of Roeber et al.

None of the documents teaches to form a laminate article using a tie layer formed from the same polymer as used in one of the adjacent layers modified with a coupling agent as specified in the claims. At least for this reason claims 1-3, 7, and 10-11 are not obvious.

Withdrawal of the rejection is therefore respectfully requested.

Additional Argument for Claim 7

The Office Action states, discussing Padwa :

The thermoplastic resin used can be a polymer containing esters of olefinically unsaturated carboxylic acids, thus it is a polyester.

This statement is understood to be applying a construction of the "polyester" recited in claim 7.

The applicant disagrees that a polymer containing esters of olefinically unsaturated carboxylic acids is a polyester for purposes of claim 7. The term "polyester" is used in the application only to describe polymers, not coupling agents, and it is used in the conventional sense of "a polymer having ester groups in the main chain." See <http://en.wikipedia.org/wiki/Polyester>.

This is clearly evident from the fact that PET is used as exemplary of polyester ([0015], [0019] and also that copolymers of olefin monomers with vinyl acetate or methacrylate esters are included in the definition *polyolefin* ([0022])). Although claim 7, by its express language recites polymer, not functionality, it appears that the Examiner has been confused by the use of the "poly"

prefix in claim 1 in connection with the plural functionality of the coupling agent. To remove this apparent confusion, claim 1 has been amended to recite "compounds having plural ... groups thereon" for each of the coupling agent functionalities. No change in scope of either claim 1 or claim 7 is intended, but the clarification is a traverse of the reading of Padwa onto claim 7. Padwa does not disclose a polyester.

New Claims 64 -74

New independent claim 64 and dependent claims 65-74 pertain to coextruded medical device tubing. The invention of independent claim 64 addresses a problem of matching adhesive properties for a tie-layer in a coextruded medical device tubing laminate that provides good adhesion between the layers but does not require the introduction of additional polymers.

In claim 64, like claim 1, a tie-layer polymer material is obtained by melt modification of one the first or the second polymer materials. That is, modification of one of the same materials used for the first and second layers. Again, this is not merely a polymer of the same monomer(s). Before it is modified in the manner specified in the claims, the tie layer polymer is the same material as is used for one of the two layers. The tie layer is formed by modification of that polymer material with a coupling agent. Also according to claim 64, the tie-layer bonds the first and second layers. Therefore no intervening layer is involved. In claim 64 the recitations again apply to three adjacent layers.

Further in claim 64 the coupling agent satisfies one or both of "a member of the group consisting of compounds having plural epoxy groups thereon, compounds having plural oxazoline groups thereon, compounds having plural carbodiimide groups thereon and compounds having plural isocyanate groups thereon" and "the tie layer material further comprises a catalyst

for reaction of the coupling agent with functional groups on said other of said first and second polymer materials.

The skilled person would not look to any of the documents Padwa, Roeber et al, or Vonk et al to find techniques or recipes for forming coextruded medical device tubing.

Padwa discloses composite sheet prepared by coextrusion or compression molding used for truck-bed and refrigerator liners is formed as a three layer (single tie-layer) or four layer (dual tie-layer) laminate. A skilled person seeking to prepare coextruded medical device tubing will not look to Padwa. Composite sheet prepared by coextrusion or compression molding used for truck-bed and refrigerator liners is not sufficiently analogous to medical device tubing to be considered to solve problems in bonding extruded medical tubing layers.

Roeber et al pertains to multilayer plastic pipe. This is also not seen to be analogous art for producing medical device tubing. Furthermore Roeber et al does not lead one to use the same polymer material in its tie layer as in one of the adjacent layers. Therefore, even if the formation of multilayer plastic pipe would have been considered analogous to medical device tubing, the document does not suggest the invention of claim 64.

Vonk et al pertains to a bituminous composition and use as a self-adhesive. It has no relationship to medical device tubing or even a more generalized problem of bonding layers produced by coextrusion. A skilled person will not look to Vonk et al for any reason in connection with the provision of a laminate article and certainly not to find a way to simplify provision of a tie layer in a medical tubing coextrusion.

Conclusion

The combination of Padwa, Roeber et al, and Vonk et al does not teach to use the same polymer material in the tie layer and one of the adjacent layers and so the outstanding rejection should be withdrawn . Further, the documents do not suggest the coextruded medical device tubing as claimed in new claims 64-74. Accordingly the application is believed to be in condition for allowance. Early and favorable action thereon is respectfully requested.

Respectfully submitted,
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